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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,582	04/16/2004	Rolf Pfeifer	3926.081	1763

7590 09/07/2005

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Tampa, FL 33634-7356

EXAMINER

LIN, ING HOUR

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 09/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/826,582

Applicant(s)

PFEIFER ET AL.

Examiner

Ing-Hour Lin

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 21-22, 25-27, 30-33 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langer et al in view of Naito et al.

Langer et al (col. 3 lines 14+) teach the claimed casting mold including porous ceramic produced by selectively sintering binder coated ceramic particles for casting metals (col. 12, lines 41+), and teach methods of producing a green casting mold by rapid prototyping method including 3D-CAD construction using the binder coated ceramic particles including zirconium oxide (zirconic sand). Langer et al fail to teach the use of coated coarse ceramic particles and fine silica.

Art Unit: 1725

However, Naito et al (col. 7, lines 39+) teach the use of coated coarse ceramic particles with size of 1-5 mm and fine silica with size of 0.1-10 microns and 1-20 wt% organic binders for the purpose of controlling mechanical strength and physical properties of molding including coefficient of thermal expansion greater than $8 * 10^{-6} K^{-1}$ or 0.8% at 1000° C (see Table 10 on cols. 23-24). It would have been obvious to one having ordinary skill in the art to provide Langer et al the use of coated coarse ceramic particles and fine silica as taught by Naito et al in order to effectively prevent porosity in the cast alloys by controlling mechanical strength and physical properties of molding including coefficient of thermal expansion and controlling the reduction of sintering temperature, wherein the smaller particle has lower sintering temperature compared to the coarse particles.

4. Claims 23-24, 34-35 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langer et al in view of Naito et al and further in view of either Zoia et al or Smith et al.

Langer et al in view of Naito et al fail to teach the use of optimal design including reinforcing ribs and cooling channels and support including back-fed ceramic material.

However, Zoia et al (col. 3, lines 3+) teach the use of optimal design including reinforcing ribs 100 and cooling channels for the purpose of controlling both strength and structure and Smith et al (col.4, lines 10+) teach the support including back-fed ceramic material such as unconsolidated mold 41 formed from alumina for the purpose of supporting the mold during casting. It would have been obvious to one having ordinary skill in the art to provide Langer et al in view of Naito et al the use of optimal design including reinforcing ribs and cooling channels as taught by Zoia et al in order to effectively control both strength and structure

Art Unit: 1725

and the use of support including back-fed ceramic material as taught by Smith et al in order to effectively support the mold during casting.

5. Claims 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langer et al in view of Naito et al and further in view of Kington.

Langer et al in view of Naito et al fails to teach the use of matching the coefficient of thermal expansion between the casting mold and the supper alloys to be cast in the mold.

However, Kington (col. 1, lines 43+) teaches the use of matching the coefficient of thermal expansion between the casting mold and the Ni-supper alloys to be cast in the mold for the purpose of preventing porosity in the cast alloys. It would have been obvious to one having ordinary skill in the art to provide Langer et al in view of Naito et al the use of matching the coefficient of thermal expansion between the casting mold and the Ni-supper alloys to be cast in the mold as taught by Kington in order to prevent porosity in the cast alloys.

6. Claims 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frank et al in view of Naito et al.

Frank et al (col. 2, lines 40+) teach the claimed powder mixture for producing insert (core) for precision cast molds comprising coated coarse alumina and fine alumina coated by polymer binder (thermoplastic wax-based binder), wherein the fine alumina lowers the sintering temperature (col. 3, lines 40+).

Frank et al fail to teach the use of other fine ceramic particles such as fine silica.

Art Unit: 1725

However, Naito et al (col. 7, lines 39+) teach the use of fine silica with size of 0.1-10 microns and 1-20 wt% organic binders for the purpose of lowering the sintering temperature and controlling mechanical strength and physical properties of insert (core) including coefficient of thermal expansion greater than $8 * 10^{-6} K^{-1}$ or 0.8% at 1000° C (see Table 10 on cols. 23-24). It would have been obvious to one having ordinary skill in the art to provide Frank et al the use of coated coarse ceramic particles and fine silica as taught by Naito et al in order to effectively control mechanical strength and physical properties of molding including coefficient of thermal expansion and effectively reduce sintering temperature, wherein the smaller particle has lower sintering temperature compared to the coarse particles.

Response to Arguments

Applicant's arguments filed 6/27/05 have been fully considered but they are not persuasive. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, applicant's argued that high coefficient of thermal expansion is needed. However, Naito et al (col. 7, lines 39+) teach the use of coated coarse ceramic particles with size of 1-5 mm and fine silica with size of 0.1-10 microns and 1-20 wt% organic binders for the purpose of controlling mechanical strength and physical properties of molding including

Art Unit: 1725

coefficient of thermal expansion greater than $8 * 10^{-6} \text{ K}^{-1}$ or 0.8% at 1000° C (see Table 10 on cols. 23-24) and the value of the coefficient of thermal expansion is in the applicant's claimed range. It would have been obvious to one having ordinary skill in the art to provide Langer et al the use of coated coarse ceramic particles and fine silica as taught by Naito et al in order to effectively prevent porosity in the cast alloys by controlling mechanical strength and physical properties of molding including coefficient of thermal expansion and controlling the reduction of sintering temperature, wherein the smaller particle has lower sintering temperature compared to the coarse particles.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 1725

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ing-Hour Lin whose telephone number is (571) 272-1180. The examiner can normally be reached on M-F (8:00-5:30) Second Friday Off.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

I.H.L.

I.-H. Lin

9-1-05


KUANG Y. LIN
EXAMINER
GROUP 320
1725